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An Examination of the State of Workplace Learning at the End of the 20th Century

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This research note provides a snapshot of the state of workplace learning at the end of the 20th century. It also describes the training investment made by U.S. organizations, including the U.S. Army. This research note also reviews the links between workplace learning and a few central tenets of social cognition: (a) situated cognition, (b) regulatory behaviors, (c) efficacy, (d) shared mental model, and (e) transactive memory.

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AN EXAMINATION FOR THE STATE OF WORKPLACE LEARNING AT THE END OF THE 20TH CENTURY

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Introduction

The training of employees is the backbone of the contemporary workplace. Be it the United States (U.S.) Army, a governmental agency, a multinational giant, or a neighborhood grocery store, employees must be provided with the training necessary to develop the skills for functioning productively in the work environment.

This paper examines the state of workforce learning as the 21st century approaches. This examination involves a brief description of workplace training activities for U.S. organizations, including the U.S. Army. This report also includes a brief description of the relationship between workplace learning practices in the U.S. and social cognition, which is a current topic of interest in the field of educational psychology. This report should thus help civilian and military trainers and researchers better understand the current state of workforce learning in the U.S.

State of Workplace Learning in U.S. Organizations

This section examines the data concerning workplace learning activities for U.S. non-military (civilian) organizations with 100 employees or more and for the U.S. Army. These two types of organizations are discussed in the ensuing pages, respectively.

Civilian Organizations

Financial and temporal investments. U.S. civilian organizations in the 1990s invested heavily in the training of their employees. In 1999, these organizations budgeted $62.5 billion on formal training programs for their employees (Training Magazine, 1999). The Bureau of Labor Statistics ([BLS], 1995a) discovered that the average training costs for U.S. workers in wages and salaries during a six-month survey period were approximately $647, with approximately 65% of these costs' involving the employees' informal training experiences. The annual costs of training employees for U.S. organizations could then be higher than the reported $62.5 billion.

In the 1990s, U.S. workers spent a sizeable amount of their work time on training activities. On average, workers completed 2.1 formal training programs during a six-month survey period (BLS, 1995a). Also, on average, these workers claimed to have received 44.5 hours (over a workweek) of training (BLS, 1995a). Informal instruction accounted for approximately 31.1 (70%) of these 44.5 hours (BLS, 1995a).

Training activities. The most prevalent training activities for U.S. civilian organizations, during the mid and late 1990s, involved employees' computer, professional/technical and managerial skills (Training Magazine, 1999; BLS, 1995a; 1995b). More hours of computer training (2.1 hours per employee) were provided employees during the survey period than any other type of formal job-skills training, with professional/technical training of employees as the next most frequent type of formal training program (BLS, 1995b). The BLS survey (1995a) also showed that training in computer skills was the most predominant informal training activity, with approximately 35% of the sampled workers claiming to have received such training. A relatively high percentage, between 30-34% of the sampled workers, also claimed to have received informal instruction with regards to: (a) production/construction tasks, (b) managerial activities, (c) sales and customer relations, and (d) clerical and administrative support tasks.

Training benefits. The available information concerning the benefits of workplace learning activities to U.S. workers and organizations has focused on formal training programs. Both U.S. workers and organizations seem to benefit from such training programs. More than 90% of the workers sampled by the BLS (1995a) indicated that they received some benefits from their formal training experiences, with learning specific job skills (e.g., new sales techniques) cited as the most beneficial.

In addition, the BLS (1995b) found that U.S. civilian organizations benefited from the formal training of their employees. Organizations with the lowest rates of employee turnover and the highest rates of employment growth provided their employees with the most hours of formal training during the survey period. Conversely, organizations with the highest rates of labor turnover (turbulence) provided their employees with the fewest formal training opportunities.

The U.S. Army

Financial investment. Laying a quality training foundation for the Army is a costly process. In fiscal year (FY) 1999, the Army spent nearly $3 billion dollars on training its active components, the full-time members of the Army (Office of the Assistant Secretary of the Army, 2000). This figure represents approximately 15% of the Army's allocations in FY99 for Training and Doctrine Command's (TRADOC) Operations and Maintenance (Deputy Chief of Staff for Resource Management, June 2000).

The $3 billion figure might be an underestimation as the Army's investment in training its personnel during FY99. This figure, seemingly, represents the costs involved in providing Active Components with formal training programs. However, the predominant mode for training Army personnel involves training activities that occur at a unit's home station. Costs available for such training purposes are not readily available. The cited

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allocation for training Army personnel also did not include costs for training the Army's Reserve Components.

Formal instructional programs. The TRADOC's role in the training of Army personnel involves developing and presenting soldiers with formal instructional programs (courses), generally in residence at institutions or TRADOC schools, such as the Armor School at Fort Knox, KY. Each course is designed for training soldiers to perform a certain role or set of functions, such as becoming an armor platoon leader. A TRADOC course is thus geared toward the individual skill training of Army personnel.

During the course of a career, a soldier takes a series of TRADOC-developed courses. A senior armor non-commissioned officer (NCO), for example, would most likely have taken the "Primary Leadership Developmental Course" for enlisted personnel, the "Basic Non-Commissioned Officer's Course," and the "Advanced Non-Commissioned Officer's Course," at the Armor School (Fort Knox, KY). Since each of these courses takes several months to complete, the Army has a large investment in the training of each senior NCO. The Army has a similar investment in the training of its mid-grade and senior-grade officers.

The curriculum of a TRADOC-developed course is presented through a variety of training media, such as classroom (platform) instruction, live field exercises, and simulated exercises. The Armor Officer Basic Course at Fort Knox, for example, consists of students' receiving approximately 25 days of platform instruction on matters pertaining to Armor tactics. They also spend approximately 12 days in a virtual and constructive simulated warfare situations and 10 days in live field exercises. This particular course thus provides students with a relatively equal balance of classroom and hands-on instructional experiences.

Home-station training activities. Operational Army units get a significant amount of their training at their home station. Ultimately, the unit commander is responsible for the unit's training. The TRADOC recommends that the unit commander's training strategy include all appropriate training systems, aids and devices (FM 25-101; Department of the Army, 1990). A unit's home-station training activities, thus, represent a less formal training experience than those for the TRADOC schools.

The Close Combat Tactical Trainer (CCTT) is an example of an appropriate system for training mounted vehicle units to conduct tactical procedures. This system is comprised of a networked set of mounted vehicle simulators that can interact in real time. Its database can provide training participants with a variety of battlefield-like conditions (e.g., fog or clear weather engagements) under which they must conduct their tactical procedures.

Unit commanders, however, may not have fully exploited the CCTT's instructional potential or those of other simulation-based training systems (Shlechter & Finley, 2000). Standardized training programs have not been included in the fielding of these systems. A simulation system's training effectiveness could then vary from training unit to training unit (Bessemer, 1989 as cited by Shlechter & Finley, 2000).

Structured-simulation based training (SST) programs. To help optimize the effectiveness of the available Army training simulation systems (e.g., the CCTT), the Army Research Institute (ARI) and its contract personnel have developed a series of structured simulation-based training (SST) programs. This series consists of the following instructional programs: (a) The "Virtual Training Program" (VTP), the initial program in the SST set, (b) "Structured Training for Units in the Close Combat Tactical Trainer" or "STRUCCTT," (c) "The Staff Group Trainer" or "SGT," and (d) The "Combined Arms Operations at Brigade Level, Realistically Achieved through Simulation or "COBRAS." Mounted vehicle platoons and companies are the primary training audience for the VTP and STRUCCTT; battalion and brigade staffs are the intended training audience for the SGT and COBRAS set of exercises.

The SST programs contain training materials that focus on specified training or performance objectives. Many of these programs also contain standardized exercise events to cue a unit's performance. The SST programs are thus providing operational units with more formal training than they would receive at their home stations. (See Shlechter & Finely, 2000 for more details about the objectives and the standardized events associated with the different SST programs.)

Training benefits of the SST programs. This discussion focuses on the VTP. Army Research Institute personnel have conducted four evaluations of the VTP, with each evaluation obtaining positive data about the program's effectiveness or efficiency (e.g., Shlechter, et. al., 1995; Bessemer, Shlechter, Nesselroade, & Anthony, 1995). For example, units participating in Shlechter et al.'s (1995) investigation further developed their collective tactical skills as a function of their VTP training. This instructional program can apparently provide units some of the training necessary to make them battle ready. (Further information about the SST programs is presented later in this paper.)

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Summary and Conclusions

This section delineates a number of similarities between the learning activities found for U.S. private/non-private organizations and those for the U.S. Army.

1. Both invest heavily in the formal training of their employees.

2. The formal training programs for both tend to consist of a variety of instructional media, including classroom instruction and computer-based instructional media.

3. Formal training activities seem to deal mainly with helping individuals learn specific job skills, such as use of specialized computer software and Army tactics.

4. The training activities of U.S. workers and soldiers are apparently beneficial to both the individual person and the organization.

This section has provided information concerning the current state of workplace learning activities for U.S. organizations. However, this information has primarily focused on formal training activities because little has been documented about the nature of the unstructured (informal) training of the American worker. Yet, U.S. workers are likely to receive more informal than formal training during the course of their careers.

Insights into the informal learning at the workplace could come from the social cognition literature. This is because social cognition refers to cognitive abilities that are acquired from such social sources as work settings. Social cognition also refers to skills for social situations, which may differ from those for such job-specific skills as trouble-shooting a computerized network system.

Social Cognition and Workplace Learning

This section provides a brief review of the links between workplace learning and a few central tenets of social cognition. These tenets are: (a) situated cognition, (b) regulatory behaviors, (c) efficacy, (d) shared mental model, and (e) transactive memory. The ensuing pages contain an overview of each of these terms and a discussion of each term's relevance to workplace learning activities. Training programs developed by ARI, including the SST programs, are used to illustrate this link for Army learning activities.

Situated Cognition

Overview. Proponents of the situated cognition perspective of human learning have underscored the dynamic interaction that

exists among human cognitive activities, environmental contexts, cultural factors, and historical influences (Thompson & Fine, 1999). This interaction involves the integration of an activity's symbolic structure with an individual's internal cognitive symbols or codes (Scribner, 1984). Writing, for example, involves the integration of a particular symbolic structure (e.g., certain graphic marks) with coded internal entities.

Situated cognition theorists (e.g. Cognition & Technology Group at Vanderbilt, 1990; 1993; Greeno and the Middle School Mathematics Through Application Project Group, 1998) have discussed this integration of external codes with internal codes in terms of affordances and attunements. Affordances refer to those environmental features that enable a person to internalize the activity's symbolic structure. For example, a teacher might provide the mnemonic of "HOMES" for helping students learn the names of the Great Lakes—Huron, Ontario, Michigan, Erie, and Superior. Attunements represent a person's ability to focus upon the appropriate environmental affordances. For example, a good English student is able to focus his/her attention on the key passage of a story.

Links to the civilian workplace. Scribner and her associates at the Laboratory for Cognitive Studies of Work (Beach, 1993; Scribner & Beach, 1993; Martin & Scribner, 1991; Scribner, 1984; Scribner & Sachs, 1991; Stevens, 1993)[1] have completed several seminal works concerning the links between situated cognition and workplace learning. Their work has involved the use of both ethnographic research techniques (e.g., controlled observations) and simulated experiments. They have used these techniques to discover the cognitive functioning that occurs in such work activities as bartending (Beach, 1993), being a waitress (Stevens, 1993) and learning the ropes in a stockroom (Scribner & Sachs, 1991).

The researchers at Scribner's laboratory found that complex informal learning does occur in work settings. This learning includes the development of problem-solving skills (Beach, 1993; Martin & Scribner, 1991; Scribner & Sachs, 1991; Stevens, 1993). They also found that the cognitive activities of workers involve the integration of their goal-directed behaviors and environmental affordances.

This last point is illustrated by Beach's (1993) investigation of the congitive skills exhibited by expert and novice bartenders. During a simulated experiment, he found that the professional bartenders were attuned to their "customers' names and preferred drinks;" while, students from a bartending school were attuned to the instructions in a bartending guide.

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[1] This laboratory closed with Dr. Scribner's death in July 1991. Thus, her students completed some of the cited works.

This difference occurred because the professionals were striving to get tips, and the students were still learning how to mix the different drinks (Beach, 1993).

Links to the Army workplace. The SST and The "Adaptive Thinking Program of Instruction" ([AT POI] (Ross & Lussier[2], 1999) training programs contain elements of situated cognition. (Both of these programs were created, at least partially, under the auspices of ARI.) The SST exercises tend to immerse training participants in situations that resemble an actual battlefield or scenario. The STRUCCTT set of exercises, for example, contains factors of mission, enemy, time, troops, and terrain (METT-T [Department of the Army, 1996]) that mirror those found in the battlefield. The immersion of training participants in VTP tables should help them become more attuned to battlefield conditions or affordances.

The AT POI is designed to train U.S. Majors and Lieutenant Colonels at the U.S. Army Command and General Staff College to become better decision makers. A set of AT POI exercises consists of "themes" that are associated with expert perceptions of battlefield events. One such theme is "Model the *thinking* (italicized by Ross & Lussier, 1999) of the enemy" (p. 6). The exercises are also comprised of probes that force training participants to practice using these themes in a variety of tactical situations. Students taking the AT POI course have been found to be better adaptive thinkers than those who take the traditional program of instruction. In situated cognition terms, the AT POI students become attuned to those affordances (themes) that are found in different tactical situations.

The cognitive activities of the SST and the AT POI training participants may have also involved the integration of their goal-directed behaviors with the environmental affordances. Ross and Lussier's (1999) training participants were upwardly mobile Army officers who tend to be self-starters. And, one expects that units for an SST set of exercises would want to make the most out of this training opportunity.

Self-Regulation

Overview. Self-regulation is the goal-directed process by which learners transform their intellectual abilities into academic and professional skills (Zimmerman, 1998). This process contains three sub processes: (a) forethought, which involves goal-setting and planning, (b) performance control, which consists of self-monitoring and attention focus and (c) self-reflection, which includes self-evaluation (Zimmerman, 1998).

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[2] Dr. Lussier is a Research Psychologist with ARI-Fort Knox.

According to Zimmerman (1998), these processes are cyclical. A person's goal setting determines his/her attention focus, which is monitored by his/her self-reflections. The person's self-reflections would then shape his/her future plans for the particular task or other similar tasks.

Zimmerman (1998) and others (e.g., Graham, Harris, & Troia, 1998) have argued that experts, regardless of their field, are self-regulated performers, while non-experts are not. Professional authors, for example, are continuously monitoring their work, and appropriately revise portions of it (Graham et al.). For example, Susan Sontag, author of On Photography, would often have 30 or 40 drafts of a page (Graham et al.) Graham has then suggested that such self-regulatory rigor is a key difference between a published author (an expert) and a less successful one.

Zimmerman & Bonner (1996) have postulated that development of a self-regulatory skill involves a four-step process, which follows dictums of observational learning. This process is illustrated through bridge (a card game) lessons, which take place at a bridge studio. Typically, beginning students observe an instructor study each card, as the cards are exposed on the bridge table. This is an example of step 1, observational learning. At step 2, students emulate the instructor's strategy at the bridge studio with coaching and support from him/her. The more advanced students would then start playing pre-determined "hands"(cards set-up by the teacher) with each other at the bridge studio, without guidance or support from the instructor. Finally, at step 4, students could use the recommended bridge strategy wherever they played bridge (adaptive performance/ thinking; Zimmerman & Bonner, 1996). The onetime beginning bridge players have now become skilled players.

Links to the civilian workplace. A search of the on-line PsychINFO (Information) and Education Resource Information Center (ERIC) databases indicated that little research has been done on the relationship between self-regulatory skills and job success (Frayne & Latham, 1987; Stewart & Manz, 1995; VandeWalle, Brown, Cron, & Slocum, 1999). The available literature has indicated that the development of self-regulatory skills is an important determinant of successful job performance (Faryne & Latham, 1987; Stewart & Manz, 1995).

VandeWalle et al. (1999) investigated the influence of self-regulation tactics on the performance of 158 salespeople who were selling the same piece of medical equipment during a quarterly promotion. VandeWalle et al. developed a questionnaire to measure the salespeople's goal orientation, which included learning orientation (e.g., development of sales skills) and performance orientation (e.g., recognition by others). This questionnaire also measured the following self-regulatory tactics: a) goal setting (number of projected units sold), b) intended effort (self-ratings of time, work, and intensity) and

c) intended planning (e.g., making a weekly plan). They found a positive relationship between the salespeople's learning and performance, with the three self-regulatory tactics influencing this relationship.

Several researchers in the area of workplace learning have suggested that U.S. organizations can do a better job of providing opportunities for developing their workers' self-regulatory skills (Marsick, 1988; Marsick & Watkins, 1998; Scribner & Sachs, 1991). Marsick & Watkins suggest that organizations should adopt a training program similar to the program proposed by Zimmerman & Bonner (1996) for self-regulatory skill development. This program, for example, would consist of a mentor who serves as the employee or employees' coach.

Links to the Army workplace. Army officers and senior enlisted personnel need to develop their self-regulatory skills, because such skills are important to their functions. For example, a platoon leader must be able to write an operation order (OPORD) for his platoon, which includes plans and contingency plans for the platoon's operation. A platoon's OPORD is based upon more comprehensive OPORDs from higher echelons (e.g., battalion and brigade).

The SST and the AT POI programs provide Army officers with opportunities to further develop their self-regulatory skills. The AT POI, for example, contains several components of Zimmerman and Bonner's (1996) model of a self-regulatory instructional program. These components include demonstrations of expert performance and expert coaching. In addition, the AT POI program encourages students to continually self-assess their performance (Ross & Lussier, 1999). The ultimate outcome in the AT POI program is the development of students' adaptive thinking skills, which are the hallmark of self-regulatory thinking.

Efficacy

Overview. Self-efficacy is a person's judgments or perceptions about his/her competence to performance a particular task (Bandura, 1986). These judgments can mold the decisions a person makes about the course of action to pursue concerning that task (Bandura). For example, mountain climbers will tend to climb those peaks that they think they can climb safely. Self-efficacy is thus a driving force of one's self-regulatory behaviors (Zimmerman, 1998).

One's self-efficacy can also affect his/her task persistence (Bandura, 1986). The educational psychology literature indicates that students who believe that they can perform well on a math task, for example, persist longer than those who doubt their capabilities (Schunk, 1998). Those students who overestimate their math abilities, for example, do become discouraged through frequent failures. Yet, a slight

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overestimation of one's abilities can motivate a person to learn more about the particular subject matter or task (Bandura, 1986 as cited by Schunk).

The term, efficacy, can also refer to the collective efficacy of a team or small group (Bandura, 1986; 1998; Marks, 1999; Zacarro, Blair, Peterson, & Zazanis, 1995 as cited by Marks). Perceived collective efficacy is a group's shared belief in its capabilities to work together in order to execute the required course(s) of action (Bandura, 1998). It is, thus, a group-level attribute that may be greater than the sum of the members' perceived self-efficacies (Bandura). Feltz and Lirgg (1998), for example, found that the collective efficacy of six collegiate ice-hockey teams fluctuated after each win and loss, but a player's personal efficacy remained stable.

Efficacy theorists (e.g., Bandura, 1986; Schunk, 1996) have postulated that a host of factors (e.g., actual experience, observational learning, or familial/cultural expectations) may determine a person's (or group's) sense of efficacy (Bandura). Actual experience, especially early in the course of developing a skill, may be the most influential factor. Learners must then, initially, experience success or feel that they can be successful in performing that task; otherwise, they develop a low sense of efficacy for that task.

Bandura (1998) has made several additional claims about the development of self-efficacy. He notes that when a strong sense of efficacy is established, occasional failures are unlikely to have much effect on a person's (group's) sense of efficacy. Furthermore, an enhanced sense of efficacy tends to generalize to other situations.

Links to the civilian organizations. Several reviews of the self-efficacy literature have revealed positive links between this construct and work-related activities (Bandura, 1998). For example, salespeople with a high sense of efficacy tend to sell more policies, with a higher net value, than those salespeople with a low sense of efficacy. In addition, employees with a secure sense of personal efficacy are more motivated to participate in developmental activities than are those with a lower sense of efficacy (Baldwin & Magjuka, 1997).

Bandura (1998) has also suggested that workers with a low sense of efficacy are more prone to "burn-out" than those with a more secure sense of efficacy. He especially notes this phenomenon with teachers. Coladarci (1992, as cited by Bandura) has found that teachers' sense of instructional efficacy is the predictor of their commitment to stick with teaching, regardless of the environmental constraints.

Several researchers (e.g., O'Neil & Mone, 1998; Morrison & Brantner, 1992), however, have found the relationship between self-efficacy and organizational and professional commitment is

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not as clear as stated above. O'Neil and Mone found an interaction among 270 health-care employees' sense of equity (the perceived ratio between pay and input), self-efficacy and job satisfaction. For example, those workers with a high sense of equity and efficacy were more likely to experience lower job satisfaction than those with a high sense of equity but a low sense of efficacy.

Links to the Army. Shamir, Brainin, Zakay, and Popper (2000) have found that collective efficacy beliefs may affect military unit's perceived combat readiness. They developed a four item Likert-scale questionnaire to assess Israeli field units' collective efficacy of their readiness. Participants' responses to these items were found to correlate with measures of: (a) unit identification, (b) unit discipline, (c) confidence in the leader, (d) leader 's confidence in the company, (e) unit soldier's experience, and (f) unit leader's tenure. The strongest predictor of the subjects' collective efficacy was their identification with the unit.

The SST exercises may provide a U.S. Army unit with the training experiences needed to develop a secure sense of collective efficacy. Each set of exercises begins with easy or fundamental tasks and then proceeds to the more difficult or complicated tasks. In addition, the program's instructional personnel lead a discussion after each exercise about what a unit has done well and not so well during the exercise. However, the previously stated assumption about the SST exercises and a unit's collective efficacy has not been examined.

Shared Mental Model

Overview. The construct "shared mental model" refers to a team's common model of the problem or situation (Orasanu, 1990). This model includes a shared understanding of the group's plans and strategies for coping with an emergent situation (Orasanu, 1990). This construct can be considered as another component of the group's regulatory behaviors, as both constructs relate to strategic and adaptive thinking.

A team's mental model has been shown to be a defining characteristic of a successful team (Cannon-Bowers, Salas, & Converse, 1993; Salas, Cannon-Bowers & Blickensderfer, 1997; Minionis, Zaccaro, & Perez, 1995; Orasanu, 1990; Stout Cannon-Bowes & Salas, 1996/1997). Orasanu (1990), who analyzed the decision-making processes of ten two-person crews flying simulated 737 aircraft at the NASA-Ames Research Center, concluded that effective flight-crew decision making and performance were dependent upon the crew's having a shared mental model of the situation. Orasanu has conversely concluded that some aeronautical disasters, such as a jet crash killing 73 people, were the results of the crew's not having a sufficient shared mental model of their responses to adverse conditions.

Salas et al. (1997) and Stout et al. (1996/1997) present training strategies for fostering a team's shared mental model. Salas et al suggest a cross-training strategy, which involves providing each team member with limited practice of the roles and tasks of other team members. Stout et al. have suggested the need for devising collective training programs for such shared mental model components as team planning. This training program should consist of such instructional techniques as guided practice and coaching.

Salas et al. (1997) and Stout et al. (1996/1997) advocate the use of training simulations to foster a team's shared mental model, because practice on the actual tasks may be too costly or dangerous. They both also describe the need for team members to provide corrective feedback to each other. However, neither provides any procedures for assessing changes in the training participants' shared mental model.

Researchers have suggested that a lack of a viable assessment instrument is a ubiquitous problem in the shared mental model literature. (See Cooke, Salas, Cannon-Bowers, & Stout, 2000 for a discussion of this research literature.) Cooke et al. have also claimed that a single assessment instrument would not be appropriate for measuring this construct's multidimensionality. They thus suggest that researchers use multiple instruments (e.g., interviews and scaling techniques) to assess a team's shared mental model. However, such an approach may be difficult to implement, because of time constraints.

Links to the civilian workplace. Other than the previously cited work of Orasanu (1990), little empirical information is available concerning the links between the shared mental construct and the workplace. A search of the on-line PsychINFO and ERIC databases indicated fewer than ten citations on this topic. Furthermore, the cited works were either not easily accessible dissertations (e.g., Heffner, 1998).

Even though there is a lack of research on the links between shared mental models and the workplace, U.S. organizations are interested in developing shared cognition among work groups (Meister, 1998; Moreland, Argote, & Krishnan, 1996). The McDonald's Corporation, for example, developed Hamburger University nearly 40 years ago, with the mission of training franchise managers and assistant managers to develop a McDonald's mindset with regards to human relations, leadership, and problem solving. This University also stresses the need for 100% employee and customer satisfaction as a shared goal of all McDonald's personnel. Upon completion of Hamburger University, the franchise managers and assistant managers are to train their employees in the McDonald's way. Without Hamburger University, McDonalds may never have become what it is today, a corporation with over 24,500 restaurants in 114 countries. (Information

concerning Hamburger University came from Stephens & Roberts, 1999).

Links to the U.S. Army. Through a variety of means, the SST programs afford participating units with opportunities to develop further their shared mental model. The SGT, for example, contains directions for a commander and his executive officer to conduct a pre-execution huddle. These directions should help the brigade staff develop a shared mental model concerning their leadership expectations and intentions (Quensel et al., 1999 as cited by Shlechter & Finley, 2000).

Transactive Memory Systems

The transactive memory system construct refers to the memory system of working groups or teams (Wegner, 1987 as cited by Levine & Moreland, 1999). It involves the knowledge possessed by each group member concerning what each group member knows about the task (Moreland et al., 1996). If, for example, a team leader cannot recall the title of a report written by the team, he/she would get this information by asking the team member who wrote the report. Moreland et al. (1996; 1998) have thus reported that a transactive memory system provides a group with access to a more accurate recall of information than any single team member could achieve.

Moreland, Levine & Wingert (1996, as cited by Moreland et al., 1996) examined the effects of various training methods on a group's transactive memory system for assembling a radio. These conditions were: (a) group training and testing, with the same group members for both sessions; (b) individual training and then group testing; (c) individual training with a team building exercise, and then group testing; and (d) replacement. This last condition involved training people with one group of people but testing them with another. Moreland, Levine, & Wingert found that the group training and testing condition performed the best, with the strongest transactive memory system. Minimal differences were found among the performance and transactive memory systems of the other three conditions. Moreland et al. (1996) then suggested that problems associated with group turnover (turbulence) might not be as damaging as previously thought.

Moreland and Myaskoksvy's (2000) findings also have implications for the issue of group turbulence. They found that the group who received information about one another's skills performed well even if their members were trained apart. Hence, providing the remaining group members with information about the skill-level of the newcomer(s) could offset any possible negative effects that group turbulence may have upon a team's memory performance.

Implications for the workplace. The cited works of Moreland and his associates have important implications for U.S.

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organizations. Small work groups are prevalent in civilian organizations, especially among Fortune 1000 companies (Moreland et al., 1996). Nearly half of these companies were already using self-managed work groups by 1990.

Workgroups are also prevalent in the Army. For example, the primary staff of an Army brigade consists of six officers. The SST programs do provide Army brigade staffs with training opportunities that should strengthen their transactive memory systems. One such SST program is the COBRAS exercises. These exercises provide intact brigade staffs with opportunities for practicing their collective information-processing and decision-making skills in a dynamic and complex simulation-training environment (Shlechter & Finley, 2000).

Another implication of the cited work on transactive memory deals with the issue of group turbulence. This issue is especially relevant for any Army operational unit, as the replacement process for such units starts after they have been intact for a year (Major William Rademacher, August 11, 2000). Perhaps then, such turbulence does not severely hurt an existing unit's performance, especially if the remaining members receive information about the skill-levels of the new members?

Final Statements

This research note has provided an overview on the state of workplace learning at the end of the 20th century. This report has indicated that formal training of U.S. employees and Army troops is big business. It has also shown that such formal training usually deals with the development of professional skills, e.g., knowledge of Army tactics.

This report has, furthermore, delineated areas of workplace learning that need further exploration. These areas are as follows:

1. Further investigations are needed of the informal or the on-the-job training (OJT) that occurs at the workplace, which is apparently the most prevalent form of workplace learning. Other than the cited research done by Scribner and her associates in 1980s and early 1990s, very little is known about OJT.

2. The development of self-regulatory skills at the workplace and a team's shared mental model need further exploration. Both seem to be important determinants of workplace success. However, as discussed, little is known about their links with the workplace.

3. The effects of efficacy upon job satisfaction or performance need further scrutiny. The effects of efficacy on job satisfaction and performance do not seem to be as straightforward as postulated by Bandura (1986); rather, these effects seem to be the result of interactions with other job-

related variables. Investigations involving the use of path analytic techniques are needed to examine these possible interactions.

4. The development of a team's mental model for actual job situations needs closer examination. However, as discussed, a viable instrument for assessing a team's mental model does not yet exist. Hence, researchers need to develop an accepted and efficient methodology or methodologies for investigating the shared mental model construct.

5. Additional data are also needed concerning the conditions that might moderate the negative effects that turbulence has upon a group's transactive memory system. This paper has noted one such condition, which is notifying old group members about the newcomers' skill-level. In addition, Moreland et al. (1996) has suggested that work groups, especially in the civilian section, be forewarned about possible turbulence so that they can prepare for it.

The suggested future investigations should provide additional knowledge concerning the connections among environmental conditions or affordances, workers' congitive processes (e.g., self-regulatory skills), and their job performance. However, such research will not be easy. For example, additional explorations of worker's OJT experiences would involve the use of a variety of research methodologies, including such ethnographic techniques as participant-observation. However, ethnographic techniques involve a significant time investment, as one must get acquainted with the setting before observing the targeted research participants. (See Stevens, 1993 for a more detailed discussion of this technique.).

This paper has also described the SST and the AT POI instructional programs. Army Research Institute personnel were responsible for developing these programs, which bridge gaps in the Army training needs. The SST, for example, helps units to receive more structured training opportunities than they normally would have. Both programs also have links to the field of social cognition. The AT POI deals with the development of self-regulatory skills and situated cognition.

In closing, this paper has covered a number of interrelated issues concerning the state of workplace learning in the U.S. at the end of the 20th century. It seems that there is still much to explore in this field during the 21st century.

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